JPRS-UEN-84-036

10 December 1984

USSR Report

ENERGY

FBIS FOREIGN BROADCAST INFORMATION SERVICE

NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service (NTIS), Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semimonthly by the NTIS, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

JPRS-UEN-84-036

10 December 1984

USSR REPORT

ENERGY

CONTENTS

FUELS

ELECTRIC POWER

NUCLEAR POWER

PIPELINES

PIPELINE CONSTRUCTION

COMPRESSOR STATIONS

GENERAL

OIL AND GAS

POLAND BUILDS VESSELS FOR SOVIET OFFSHORE DRILLING PROGRAM

Moscow EKONOMICHESKAYA GAZETA in Russian No 44, Oct 84 p 21

[Article by TASS correspondent A. Babenko: "Polish Ships Have Been Built"]

[Text] The banner of the Soviet Union has been raised over a multipurpose tug, the "Neftegaz-11," which was built to Soviet orders at the Warski Shipyard in Szczecin. This new vessel is intended for servicing offshore drilling platforms and conducting prospecting work in the zone of the continental shelf.

The personnel of this shipyard and specialists of the All-Union "Sudoimport" (ship importing) Association have a long tradition of cooperation. Soviet orders are furthering the rapid development of the republic's shipbuilding, are largely determining the general directions of planning-and-design and research work, and are making it possible to introduce more sophisticated vessels into production. Graphic evidence of this was provided by the signing in Moscow on 10 October of a new contract which calls for the delivery of another 25 vessels to the USSR within the framework of a program called "Shel'f."

As the newspaper TRYBUNA LUDU has noted, the signing of this document was an important event in the country's economic life. It reconfirmed the fact that the Soviet Union is a major long-term client of Poland.

FTD/SNAP

CSO: 1822/70

OIL AND GAS

KRIVOY ROG SUPERDEEP BOREHOLE TARGETED AT 12 KM

Moscow PRAVDA in Russian 25 Sep 84 p 2

[Article by S. Chudakov, Dnepropetrovsk Oblast: "Start in the Geocosmos"]

[Editorial Report] The Krivoy Rog superdeep drilling project has been started. This is one of 11 drilling projects at which comprehensive study of the structure of the Earth's interior to determine the oil, gas and ore content of the country's main regions is being conducted with the aid of deep and superdeep drilling, in line with the program of the USSR State Committee for Science and Technology on the study of the Earth's crust and upper mantle.

"As yet, this is the only superdeep borehole in our republic," noted Ya. Belevtsev, member of the Ukrainian Academy of Sciences. Initial plans call for it to reach 12 kilometers, and beyond that it could be extended to a depth of 15 kilometers if necessary."

FTD/SNAP

CSO: 1822/76

OIL AND GAS

SUPERDEEP DRILLING PROJECT BEGINS IN UZBEKISTAN

Tashkent PRAVDA VOSTOKA in Russian 17 Oct 84 p 3

[Article by A. Lazarev, correspondent: "Superdeep Drilling Project Begins in Uzbekistan"]

[Editorial Report] The article reports on the start of drilling of the first superdeep geological-prospecting borehole in the Uzbek republic. Comments of G. V. Kasavchenko, chief engineer of the Kyzylkumy Geology Production Association, in regard to this project are recorded. The site of the superdeep borehole is located near the Muruntau geologists' settlement in the Kyzylkumy Desert. Plans call for sinking this borehole initially to a depth of 6,000 meters, and possibly to 7,000 meters if need be.

Kasavchenko mentions some of the organizations that are collaborating with the geology association. Expeditions of the Moscow Geological-Surveying Central Scientific Research Institute of Nonferrous and Precious Metals and the Central Asian Scientific Research Institute of Geology and Mineral Raw Materials are to work at the Muruntau borehole. The project will be under the direction of the USSR State Planning Committee, the State Committee for Science and Technology, and the USSR Academy of Sciences. Modern turbojet equipment is in use and the latest drilling technology has been introduced at the Muruntau project. This technology was developed with experience of the Kola superdeep drilling project taken into account. Plans call for the Muruntau borehole to reach a depth of 2,000 meters by 1986.

FTD/SNAP

CSO: 1822/71

COAL

COAL MINISTER NAMES STEPS THAT WILL BOOST COAL OUTPUT

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 26 Aug 84 p 2

[Article by B. Bratchenko, USSR minister of Coal Industry: "The Light of Stakhanovite Traditions"]

[Excerpts] The 50th anniversary of the Stakhanovite movement will be observed in August 1985. Born in the coal industry, it took wing and became nationwide. The remarkable record of mine-face worker of the Donetsk Underground Mine Tsentral'naya-Irmino Aleksey Grigor'yevich Stakhanov revealed what enormous possibilities are concealed in better work organization, the effective use of new equipment, and high consciousness of vocational duty and workers' honor.

In following the Stakhanov tradition, the miners have risen to the occasion here. The brigade of breakage-face workers of the Underground Mine imeni Dimitrov in the Donbass, which is under K. Severinov, became one of the first Collectives of Communist Labor in the country. Altogether this high title has been awarded to collectives of 62 underground mines, strip mines, plants, coal-preparation plants and mine-construction administrations, 5,612 sections, departments and divisions, and 13,855 brigades, and 753,760 people have become Shock Workers of Communist Labor.

New patriotic initiatives were born during this competition. The thousand-tonners' movement--collectives of brigades and sections that are mining at least 1,000 tons of coal per day from one mine face with longwall mining machines--took shape at the Donbass [Donets Coal Basin] and Kuzbass [Kuznetsk Coal Basin]. The number of such collectives has been growing. Today, 40 percent of underground coal mining is being done by thousand-tonner brigades, yet only 15 percent of all breakage-face worker manpower is working in these brigades. Later the thousand-tonners began to shoulder the goal of an annual output of 500,000 tons, and even 1 million tons, of coal. The brigades of G. Smirnov, V. Murzenko, and M. Chikh were the first to achieve this record excavation, and then another 14 brigades from the Donbass, the Kuzbass and the Pechora and Karaganda coal basins reached these goals.

The initiative of the thousand-tonners found wide support among tunneling, excavating, transporting and construction brigades and among the workers of coal-preparation plants and machinebuilding plants and other elements of the coal industry. The associations are receiving annual tasks for organizing such brigades, which are making, as is said, the "weather" of the whole

industry. This year, for example, tasks for bringing the number of thousand-tonner brigades up to 495, their followers at underground mines--high-speed tunneling brigades--to 615, and highly productive excavator and transport brigades at strip mines--to 913, have been approved. Meeting these goals is our very first task.

For it is not accidental that the thousand-tonners and their followers have proved to be the initiators of socialist competition in honor of the 50th anniversary of the Stakhanovite movement. The workers of metallurgical and other branches of the national economy have been actively included in the labor competition to complete the five-year plan in terms of some of the most significant indicators before the memorable date. The CPSU Central Committee Politburo has supported this initiative. The competition in our branch in honor of the Stakhanov anniversary has rapidly become a large-scale competition.

Workers of the Torez Underground-Mine Administration, where A. G. Stakhanov worked until the end of his days, became the first to carry out the five-year plan for coal mining by the important anniversary.

This initiative, which SOTSIALISTICHESKAYA INDUSTRIYA told about, was followed up by collectives of the Underground Mines Severnaya in the Kuzbass, imeni Kuzembayev in Karaganda and Vorgashorskaya in the Arctic, the strip mines Cheremkhovskiy in Irkutsk Oblast and Ushakovskiy in the Moscow Coal Basin, the Sibir' Coal-Preparation Plant, and many other enterprises of the industry.

An analysis of the organizational, technical and social measures that will provide for fulfillment of the counterplan by brigades indicates that the potential for more productive work exists at every enterprise and in each laboring collective. In order to realize these possibilities, the active help of economic leaders, who, together with party, trade-union and Komsomol organizations, are obligated to be constantly concerned about creating the conditions for successful fulfillment of socialist commitments, is needed. This is related in various degrees to questions of improving working and living conditions. For, if a worker has good housing, his family is well off, and there is a place for him to relax and to spend free time in a cultured manner, he will also go to the mine in a good frame of mind and work with spirit.

An important reserve for raising productive efficiency is the development of brigade forms of organization and work incentives. During the first 3 years of the 11th Five-Year Plan, workers covered by the brigade form have risen in the coal industry from 49 percent to 63 percent. More than 65 percent of the workers in brigades are paid in accordance with the final work results. The distribution of wages to take account of the labor participation factor is being performed in one-third of the brigades.

At the same time, we still have not managed to accompany the increase in the number of brigades with an increase in their work effectiveness. The number of brigades that do not cope with the plans has been reduced recently, but there continue, still, to be a substantial number of them, especially in Ukrainian SSR Minugleprom associations--30.1 percent, the VPO [All-Union Industrial Association] Kuzbassugol'--24 percent, and the Karagandaugol'

Association--29.3 percent. Because of this in particular, the industry as a whole did not, in the first 7 months of the year, fulfill its commitments for labor productivity growth. In order to increase operating effectiveness, brigades are being strengthened by including master workers, engineers and technicians in them. Standard designs, norms and work standards are being developed for the new work organization, and certification of work places, special training of brigade leaders, and planning of indicators for brigades are being performed.

In the Kuzbass, for example, consolidated "section-motor column" brigade complexes have proved themselves well at coal strip mines. These collectives, which are united by a common plan and a start-to-finish indicator for bonus awards, consist of two brigades: a mining brigade (based upon a mining section) and a transport brigade (based upon a motor-vehicle column). The introduction of three such complexes, which cover the whole automotive transport operation of the Chernigovskiy Strip Mine of the Kemerovougol' Association, has enabled annual productivity of excavators to be increased by an average of 22.4 percent. The strip mine has begun to overfulfill the automotive-transport plan for mining and stripping.

All-Union, republic and intermine schools of advanced experience have proved themselves well in the coal industry. Each year the industry conducts more than a thousand such schools, at which advanced work methods and procedures are mastered by more than 25,000 workers, engineers and technicians. As a rule, such underground-mine academies, the start of which was laid down by the distinguished teachers Nikita Izotov and Aleksey Stakhanov, are producing good results. Collective mentorship, which was also born in the coal industry--under which a brigade or section assumes an obligation to bring a lagging collective up to an advanced level--has become an effective school.

Meetings of supervisors of advanced brigades and sections at the headquarters of the industry--Minugleprom--have become a traditional form of exchange. Such meetings are arranged for the start of the year; their participants tell about their achievements and deficiencies at work and note ways to eliminate them more quickly and to achieve greater results. As a rule, the meetings are concluded with the signing of a socialist-competition agreement, in which new goals are set, and these become a high mission not only for advanced workers but also guidelines for highly productive work by all the industry's workers.

The current Underground Miners' Day is illuminated by the light of the Stakhanov tradition. The collectives of an advanced section of the Vorkuta Underground Mine Vorgashorskaya, which O. Bobrov supervises, and V. Ignat'yev's brigade from the Donetsk Underground Mine Krasnolimanskaya have greeted it with outstanding labor achievements. They have established records for coal mining at mine faces equipped with longwall mining machines, which exceeded, respectively, 10,000 and 12,000 tons of fuel per day. Greeting the nationwide holidays with meritorious deeds is one of the best Stakhanov traditions. And the underground miners will be true to it.

11409
CSO: 1822/5

COAL-MINE PARTY ORGANIZATIONS TRY TO BOOST COAL OUTPUT

Kiev PRAVDA UKRAINY in Russian 24 Jul 84 p 3

[Article by A. Zharkikh: "Always Give Light"]

[Excerpts] Notes from the seminar-conference of party organization secretaries of the republic's underground coal mines.

A republic seminar-conference of secretaries of party organizations of coal-industry enterprises met in Voroshilovgrad. Its participants discussed the tasks of party organizations in regard to strengthening organizational and large-scale political work in laboring collectives for purposes of a worthy greeting to the 50th anniversary of the Stakhanovite movement and successful completion of 1984 plans and the 11th Five-Year Plan, in light of the decisions of the 26th Party Congress and latest CPSU Central Committee Plenums and the orders of CPSU Central Committee General Secretary and Chairman of the USSR Supreme Soviet Presidium Comrade K. U. Chernenko.

Ukrainian Communist Party Central Committee Secretary B. V. Kachura delivered the report of the Politburo members.

First Secretary of the Party Oblast Committee B. T. Goncharenko told about the work of the Voroshilovgrad Oblast Party Committee on Supervision of Party Organizations of Coal-Industry Enterprises and the mobilization of laboring collectives for the fulfillment of their plans and socialist commitments. UkSSR Minister of Coal Industry N. K. Grin'ko gave information about increasing production effectiveness at UkSSR Minugleprom [Ministry of Coal Industry] underground mines, tasks for fulfilling plans for mining coal in 1984-1985, and the long-term prospects for developing the industry.

Party-organization secretaries of the underground mines shared at the seminar experience in organizational and political work.

Participating in the seminar's work were supervisor of the Heavy-Industry and Power-Engineering Section of the Ukrainian Communist Party Central Committee L. Ya. Potyaka, Manager of the Heavy-Industry Section of the Ukrainian Communist Party Central Committee M. G. Perepadya, Secretaries V. G. Kucherenko, V. A. Svyatotskiy and N. V. Bakumenko of the Donetsk, Lvov and Voroshilovgrad Oblast Party Committees, responsible workers of the Ukrainian Communist Party Central Committee, and the secretaries of some city and rayon party committees of Donetsk, Voroshilovgrad, Dnepropetrovsk, Lvov and Volyn Oblasts.

Below we print notes from the seminar-conference.

As was remarked at the seminar-conference, many underground-mine party organizations of the Donetskugol', Krasnoarmeyskugol', Roven'kiantratsit and Sverdlovantratsit Associations exert an appreciable influence on the work of the collectives. The excellent work of leading workers has permitted the industry as a whole to mine 230,000 tons of coal above the established plan during the first 6 months of the year. The collectives of 10 underground mines, 105 sections and more than 200 brigades and almost 2,000 mine-face workers have already fulfilled plans for the first 4 years of the five-year plan.

The Equipment Needs the Maximum Workload.

During A. G. Stakhanov's time, the jackhammer was considered high-powered equipment in the coal industry's. Do not compare today's mechanisms with it. During the 11th Five-Year Plan alone the republic's coal industry has obtained 850 highly productive longwall mining machines and more than 2,000 coal-digging and tunneling cutter-loaders. The state is investing colossal resources in mechanizing the more labor-intensive processes, in increasing the power-worker ratio of coal enterprises, and in improving the working conditions of underground miners. Yet the yield of this capital investment still is not great.

The Secretary of the Ukraine's Comparty [Communist Party] Central Committee B. V. Kachura noted in his report that the supervisors and party organizations of some underground mines and associations still did not know how to counteract the increasing complication of mine-geology conditions with a higher level of engineering support and to organize mining collectives to overcome difficulties and were not engaged responsively enough in matters of developing mine workings and making effective use of the potential of modern mining, tunneling and transporting equipment.

The main cause of the unsatisfactory work of various enterprises lies in the poor development of mining facilities. More than 80 underground mines in the republic are not coping with the job of developing mine workings. During the first half of the year there was a shortfall of 34 km of underground mine workings. At the same time, it is well known that coal lies beyond the rock.

Not so long ago the Underground Mine Voroshilovgradskaya No 1 was coping successfully with the plan. Gradually, the enterprise's supervisors and party committee (the secretary is A. A. Shipunov) became content and stopped concerning themselves with development of the underground mine. And the results were not slow in showing up: the tunnelers fell 500 meters of mine excavation in arrears, and the mine fell short in the second quarter of this year by 7,000 tons of fuel shipped.

Party committees are paying little attention to the use of new mining machinery. Here is the kind of data expressed at the seminar-conference: 30 percent of the mine faces with longwall type mining machines are producing only about 150-200 tons of coal per day.

It also happens that an extremely low yield of expensive modern machinery costs the state a pretty penny. And there are remarkable examples of the use of mine equipment. When KM-103 longwall mining machines arrived at Underground Mine No 3-bis of the Torezantratsit Association for the development of thinner seams, the enterpise's party committee singled out their best miners to master them. After not so long a time the first unit began to yield up to 1,050 tons of coal per day.

If only the specialists of, say, the Pervomayskugol' and Krasnodonugol' Associations and the Underground Mines Pavlogradskaya, Velikomostovskaya No 3 and certain others would go to Torez and learn how "inconvenient seams" must be developed. Then there would be fewer references to complicated geology!

Driving One's Self

CPSU Central Committee General Secretary and Chairman of the USSR Supreme Soviet Presidium Comrade K. U. Chernenko emphasized that to be engaged in management means to be concerned with people, with guiding the activity. Many underground-mine party organizations are undertaking this. The experience of the best party organizations of the Ukraine's underground mines was generalized at the seminar-conference. Twenty-three coal enterprises, 185 sections, 380 brigades and more than 3,000 mine-face workers have decided to carry out five-year plan tasks ahead of schedule by the 50th anniversary of the Stakhanovite movement. Under the leadership of party organizations, they are confidently moving toward the planned goal.

11409
CSO: 1822/5

KUZBASS COAL STRIP-MINING DEVELOPMENT NOMINATED FOR AWARD

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 28 Aug 84 p 2

[Article by A. Aganbegyan, academician and director of the Institute of Economics and Organization of Industrial Production of the Siberian Department, USSR Academy of Sciences: "The Kuzbass's Coal"]

[Text] In the competition for the USSR State Prize.

The underground coal mine has remained a standing symbol of the Kuzbass. And this is understandable: the technology level at the time that still another large "stokehole" for the country was born simply did not allow any other method for developing the unusually difficult underground. However, the time came when mining of fuel in the region began to fall behind the needs of the power-engineering, metallurgical and other industries.

Relying upon the modern level of science and technology, specialists proposed a basically new approach to the problem: begin, along with the traditional underground method, the development of open-cast mining of high-quality bituminous and coking coal. The complexity of implementing this bold idea lay in the fact that almost everything had to be started from scratch. Not only did new technology have to be developed, but a high-capacity system of economic management and equipment that is oriented to a concentration of funds and material resources that could produce a rapid and efficient return had to be created.

In other words, the exceptionally complicated mine-geology conditions, which differed sharply in various parts of the basin, had to be set off against the might of modern machinery and vigor of the scientific notions about the paths that had to be followed. It was precisely these two factors--the development and strengthening of the technical base and the choice of precise and scientifically substantiated means for achieving the goal--that determined the basic directions of the activity of Kemerovougol' Association supervisors and specialists.

The first steps on this path--organizing creative collaboration of the miners and the machinebuilders and converting the strip mines that are under construction or are being operated into a basis for practical verification of the original intentions of the researchers and the designers--are represented today by major, successfully implemented technical, economic and

managerial actions. Technical assignments were developed here for a large number of new machines, revisions were introduced into the designs that had already been created before the start of series production, and mass production was given the OK or it was rejected (there were such cases). The SBShK-200 drilling installation, the world's most powerful traction unit--the OPE-1, the mighty, high-capacity BelAZ trucks, Uralmash's walking giants, and high-capacity spoilbank draglines were first proved out on Kuznetsk soil.

A solid technical base paved the way for an innovative search for economic solutions that were highly efficient and, simultaneously, simple enough to introduce. The use for the first time of slanted drilling sharply raised the effectiveness of developing high terraces. The use of explosive energy for moving overburden rock to an excavated space cut directly the amount of excavation required and precluded the transport operation. A transport-free system became, for the first time in world practice, a part of the technology at fields with a dip angle of more than 12 degrees.

Many progressive innovations were also made in organizing the equipment operator's work. Integrated mining and transporting brigades, for example, were organized, allowing the excavators' output to be greatly increased.

The innovations proposed by Kuznetsk coal miners have become today the principles for organizing open-cast mining of coal in other basins.

Exceptionally important also was the fact that the association's specialists constantly remembered the need to protect Nature. For in about a week the Kuzbass handles as much of the hardest stripped rock as was laid during the years of construction of the foundation of the Bratskaya Hydroelectric-Power Plant. Not much time will elapse before the strip mines in the basin's northern and central regions reach 320-360 meters in depth. It must be said that these are rather important "scars" on the earth.

Two specialized recultivation administrations are engaged in "healing" them in a planned procedure. These subunits store the rock in gobbed workings, form dumps in the shape of plateaus, which are then used for sea-buckthorn plantations, restore the land, make rational use of the fertile soil removed--for the needs of agriculture, and solve many other problems of maintaining the ecological equilibrium.

In a comparatively short time the association has created a strong, highly qualified collective that can solve successfully complicated engineering, equipmental and organizational questions. The social program is being implemented sequentially. Eight hundred thousand square meters of nice housing have been built, well-constructed worker settlements have risen up, and the network of household, cultural and children's institutions, and enterprises for trade and social eating is being expanded.

Today, along with the standard designators for traditional underground mines, symbols for the new type of coal enterprises--high-capacity strip mines--have appeared on the Kuzbass's economic map. Labor productivity here is 4-fold that at underground mines, and prime production costs are 1.7-fold lower. If to this are added the facts that establishing a strip mine requires 2.5-fold

less capital investment than does the construction of an underground mine and that 120 such coal "factories" provide a third of all the mining of this oldest of basins, one can imagine the broad prospects for the complex built up by the creative daring and selfless labor of the coal workers.

I consider that award of the USSR State Prize for the creation in the Kuzbass of a large industrial and socio-economic complex for mining bituminous coal (including coking coal) by the open-cast method will be a merited evaluation of the work done.

11409
CSO: 1822/5

STATUS OF COAL MINING AT VORKUTA REVIEWED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 29 Aug 84 p 2

[Article by V. Medvedev, secretary of the Vorkuta City Party Committee: "In Regard to the Essence, and for the Sake of Form"]

[Text] About a year has passed since the meeting of Vorkuta workers with supervisors and responsible workers of a number of ministries and agencies. The preparation for it compelled people to examine more intently their work and much that surrounds us. The questions raised at the meeting made it possible to determine, plan and guide more precisely the efforts of collectives to eliminate deficiencies and omissions. The workers' proposals and observations were deeply analyzed by the city and rayon party committees and by soviet and economic organizations. They lie at the basis of current and long-term planning for the development of laboring collectives. This concerns primarily our main industry--coal.

By way of improving underground-mine operation, as the meeting with the workers suggested, we find two main directions: reequipping production, and forming strong, efficient collectives. With the help of USSR Minugleprom [Ministry of Coal Industry], longwalls were equipped with high-capacity 2UKP and KTM longwall mining machines, which meet the requirements of our mine geology. The efforts of party organizations and specialists of the Vorkutaugol' Association were concentrated on developing mine workings ahead of time.

The requirements for collective moral and material responsibility for the strict observance of labor and production discipline are now being raised widely at underground mines and construction projects. The collaboration of tunnelers' brigades with mining-section collectives is being expanded more rapidly. Thus, at the Vorgashorskaya Underground Mine, the tunnelers under Hero of Socialist Labor A. Sakharov not only have guaranteed pecuniarily the state of discipline of each brigade member but also have given their word to insure the uninterrupted work of allied workers--the No 3 million-tonner mining section.

The results of this great work are already visible. And it is not just the fact that mines of the Pechora basin, which is noted these days for its semicentennial, has now created a 2-km backlog of mine-working tunneling and mined half a million tons of coal above the plan during the first half of the year. Personnel turnover within Vorkutaugol' Association is now at a

minimum, and each coal-mining enterprise has friendly tunneling and breakage-face brigades and sections capable of supporting each other and of deciding the plan's fate. This, mainly, has permitted the average breakage-face workload to be brought up to more than a thousand tons and the number of lagging sections and mines to be sharply reduced.

Participants of the meeting expressed serious concern about delay in building Mine No 33. The situation has now been corrected. In 1984 grants for site preparation, for building a road, and so on have been increased. Next year the appropriations will be increased by 15 million rubles.

In brief, there are many changes for the good in production. Yes, indeed, but the most difficult spheres for the Arctic are social and domestic services. The questions posed by the workers were included in the city soviet's overall plan to create conditions for highly productive labor and excellent recreation for the underground miners, construction workers and geologists. And they are being realized successfully.

To be convinced of this, it is sufficient to go about the city. Dilapidated housing and huts are gradually disappearing and high-quality apartment houses with all the conveniences are rising up in their place. In the plan for civic improvements, the collectives' efforts themselves are doing much. Here one can cite the example of Teplovodokanal [Heat and Water Pipelines Administration], which is under the supervisor A. Stepanov, who has initiative and is highly respected in the city. Rebuilding of the railroad station is being finished, and improvements for the main entrance to the city have been completed.

USSR Minugleprom has been extending much help toward solving the city's municipal and domestic-services problems. Strictly, everything that Vorkuta has today has been created by coal-mine workers. And, up to the present, attention to living conditions for Vorkuta residents in this regard has not weakened. Design work is underway on a House of Culture for 600 persons in Vorgashor settlement, and a general-purpose spectator-sports complex is being built in the city.

A certain turn for the better in the arrangements for the everyday life of railroad workers has been noted. Recently, about 5,000 square meters of housing and dining halls for railroaders have been introduced, and rebuilding of the heat and water-supply grids has started. A dispensary, bathouse, boilerhouse and athletic hall are under construction, and Lengiprotrans [Leningrad State Survey and Design Institute of the Main Administration for Survey and Design Work of the USSR Ministry of Transport Construction] was given the job of designing a new railroad station for Vorkuta.

The opinion exists that the level of services for northerners and their domestic services are not, per se, very important in retaining personnel. It is considered that the extremely high pay will hold people in the Arctic. Our experience disputes this opinion. I refer to the example of that same Teplovodokanal Administration of Vorkutaugol' Association. The wages there are much lower than in the mines or at construction projects. Nevertheless, the builders have a great shortage of people today, but this administration is

fully manned. Why? Here they arrange work not only for the head of the family but also for the wife, and they are proposing a kindergarten for the children. And soon they will be given an apartment. But construction workers sometimes have to wait years for all this.

But there are still, unfortunately, no few deficiencies in solving municipal and domestic-services problems. Thousands of geologists' families are living in Vorkuta, more than 300 of them in dilapidated houses in Rudnik settlement, where the pioneers who developed the district used to live. Deputy RSFSR Minister of Geology S. Shaydurov, who came to the meeting with the city's workers, visited there. But still no actual steps have been taken to improve the geologists' living conditions.

Criticism was sounded sharply at the Vorkuta meeting against RSFSR Minavtotrans [Ministry of Automotive Transport], which, in recent years, has not built one apartment and not one kindergarten for its hundreds of workers. Its representative, G. Fominykh, justified this by the fact that there is no design. Then the city ispolkom worked out through its allocations a design for a 100-unit apartment house and sent it to the automotive transport association. But up to now nothing has been done to start construction.

The attitude of MPS [Ministry of Railways] and the Northern Railroad toward transport services for the northerners is no better. On the Vorkuta-Kotlas passenger train there is not only no dining car but not even a rudimentary buffet. Yet the trip takes more than a day. N. Biryukov, deputy chief of the MPS main administration and RSFSR Mintorg [Ministry of Trade] representative A. Kolychev made public promises about this. But practically nothing has been done.

A lack of spare parts for the 4PP-2 continuous-tunneling machine was named as a most severe problem. Both Soyuzgormash [All-Union Industrial Association for Mine-Machinebuilding] chief D. Babarik and Yasinovataya Machinebuilding Plant director M. Trutsunenko responded to this. They gave assurances that spare-parts delivery had been "taken under special monitoring by the All-Union industrial association. In form, everything is correct. But in essence? Mighty machines are still idle often at the underground mines because of a lack of parts.

The newspaper's mail box could continue the list of solved and unsolved problems raised at the meeting. But from what has been said it is clear: where these problems have been tackled in essence, the results are on hand. But there are also many of those cases where the supervisor's assertions diverge, unfortunately, from the actual state of the matter.

11409
CSO: 1822/5

FEASIBILITY OF WORKING EKIBASTUZ SEAM NO 4 DISCUSSED

Moscow UGOL' in Russian No 8, Aug 84, pp 25-26

[Article by Candidate of Technical Sciences E. B. Vagin, Engineer A. F. Ponomarev (NIIOGR [Scientific-Research Institute of Surface Mining]) and Engineer T. A. Kurochkina (IGD [Mining Institute] imeni A. A. Sorochinskiy:
"The Feasibility of Working Seam No 4 of the Ekibastuz Coal Field"*]

[Text] The intensive growth of coal production at Ekibastuz depends on the solution of a number of tasks, one of which is to determine the order in which the seams will be worked. This must be decided so that the planned volumes of coal production and overburden removal will be carried out for the entire working life of the field. Under the present plan, only the top three seams are being excavated and the overburden is being removed to separate dump sites. With this arrangement, the growth of coal output will depend on the capability of transporting ever larger volumes of material as the working depth increases and the distance to the dump sites increases. One possible way to solve this problem is to simultaneously work all the seams and then locate the dump sites in the worked-out areas.

The field's coal-bearing formation consists of six coal seams of workable thickness (see Fig 1).

Seams Nos 5 and 6 have been exposed only by a few exploratory drill holes. Their geological structure, the extent of their thickness and the quality of their coals have not been sufficiently studied. Their working thickness is 7-9 meters. The normal distance between seams Nos 5 and 6 is 30-50 meters; the distance between seams Nos 4 and 5 is 220-270 meters. Because of their relatively small thickness, their great depth and high overburden ratio (over 15), seams Nos 5 and 6 have no practical significance for surface mine development. Their reserves are categorized as non-balance.

Seam No 4 is present everywhere within the field and is stratigraphically consistent. It is thickest in the northwest (23-30.6 meters) and the southeast (16.7-24.2 meters) parts of the basin. It is thinnest (14.2 meters) in the western basin. On the northwest, steeply sloping side of the basin, seam No 4 is tectonically disturbed and loses its commercial significance. The normal thickness of the intervening rock beds between seams Nos 3 and 4 varies from 0-110 meters.

*R. M. Gusev (NIIOGR) took part in preparing the article.

Seams Nos 1, 2 and 3 are presently being worked. Seam No 4 is being partially worked only in the extreme northern part of the basin. Until recently, 97 percent of its reserves were considered non-balance. At present, balance reserves contain coal with ash content up to 60 percent. When the new conditions were instituted, the reserves of run-of-mine coal in seam No 4 were increased, by preliminary calculation, to 1,805 million tons.

The average ash content of run-of-mine coal in seam No 4 is 48.4 percent, which is similar to that of the run-of-mine coal in seam No 3 (47.1 percent).

As the Ekibastuz Fuel and Power Complex is put into operation, the demand for coal with an average ash content of 48 percent (maximum 53 percent) will increase. Production of coal from seam No 4 will be important in meeting this demand.

Calculations were made of the required volumes of coal shipments by quality categories if all four seams were worked simultaneously. This showed that seam No 4 would contribute about 11 percent of the total.

Thus, in accordance with the new conditions, the quality of coal from seam No 4 is fully acceptable for customer use, even after blending with coal from seam No 3 (which has a higher ash content than the coal from seams Nos 1 and 2).

From the point of view of surface mine development, the reserves of seam No 4 are divided into three groups. The first group contains reserves within the limits of the stable pit walls used for mining seams Nos 1, 2 and 3. These reserves will be recovered incidentally as the walls of existing pits are brought to their stable position. The second group contains reserves of low levels that can be recovered without additionally moving the pit walls. The third group contains reserves whose recovery will require the walls to be moved back.

About 70 percent of the reserves of seam No 4, beginning at a depth of 220 meters, can be recovered with moving the walls back. In this case, production from seam No 4 can begin within 20-25 years, providing that the problem of transporting overburden over the non-working walls of the pits is satisfactorily solved.

Seam No 4 can be worked by moving the existing walls in both the northern and southern parts of the basin. In the northern part, the interbed is 15-20 meters thick, and seam No 4 can be worked without significantly increasing the overburden ratio. However, because of the greater dip angle and the limited working area for organizing the internal dump sites, the southern part of the basin is preferable for production. Here the dip is 12-18° and the length of the working area for the internal dump site can reach 5-6 km. By working seam No 4 in the southern part of the basin, sufficient dump-site capacity will be available so that around 70 percent of all the overburden from further coalfield development can be taken there.

In addition, since the surface of the interbed in the southern basin is unoccupied and the depth of the workings is fairly shallow (106 meters), conditions are favorable for locating the transport routes here during the transition period (from the start of working seam No 4 to the changeover to the internal dump site). When the transition period is over, the coal will be

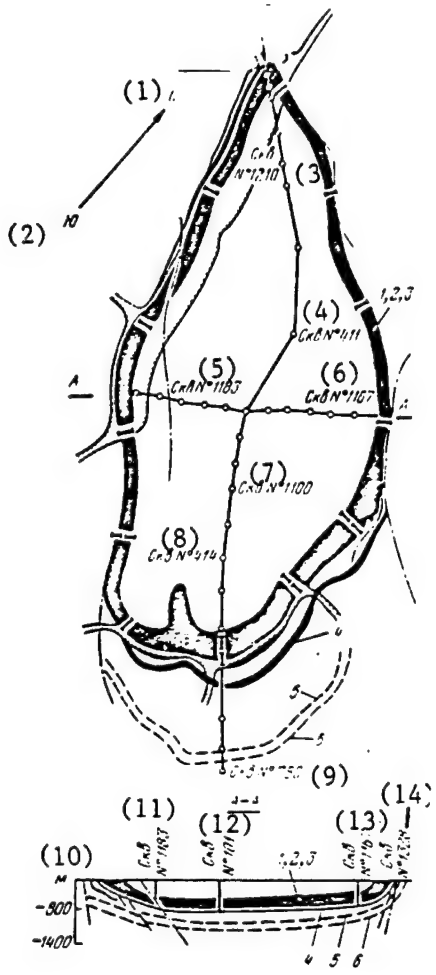

Figure 1. Plan View of the Coal Seam Exposures and Geological Section of the Ekibastuz Coal Field

1, 2, 3, 4, 5 and 6) seam numbers

KEY:

1. N
2. S
3. Drill hole No 1210
4. Drill hole No 411
5. Drill hole No 1183
6. Drill hole No 1167
7. Drill hole No 1100
8. Drill hole No 414
9. Drill hole No 780
10. meters
11. Drill hole No 1183
12. Drill hole No 101
13. Drill hole No 1167
14. Drill hole No 1328

transported over the surface by conveyors, while the overburden will be removed by train and also partially by a non-transport system, i.e. to internal dump sites.

Calculation of the volumes of the interbed and seam No 4 showed that the overburden ratio for mining seam No 4 averages 2-2.1 cubic meters/ton over the entire field. Taking into account that part of the interbed rock will be put into the internal dumps without the need for transport, the overburden ratio is reduced to 1.2 cubic meters/ton, which does not exceed the ratio for the upper three seams.

Preliminary calculations of the basic mining indicators for the southern part of the basin showed that the overburden ratio for seam No 4 to a depth of 50 meters is equal to 1.9 cubic meters/ton, taking into account the removal of coal from seam No 3 remaining in the non-working wall. Down to that level, the interbed can be handled without a transport system by placing the rock on the pit wall. When mining at the 100-meter level, the overburden ratio is 1.5 cubic meters/ton.

Research showed that it would be feasible to transport the coal from seam No 4 by conveyor. The use of conveyor transport along with rail transport for removing the interbed will allow the development and mining of seam No 4 to be carried out independently of the work on seams Nos 1, 2 and 3. At the same time, it will allow the production work on the three upper seams to be changed over to conveyor transport, using conveyor hoists or inclined shafts.

Thus, the mining of seam No 4 is possible both in the northern and southern parts of the field. Development of the southern part will allow a changeover to internal dump sites. As a result of coal production from seam No 4, the rate of deepening of seams Nos 1, 2 and 3 will be reduced. The operating conditions and basic mining indicators will be improved. Fewer expenditures will be required to fulfill the planned volume of mining and overburden removal in Ekibastuz surface mines.

12595
CSO: 1822/26

UDC 622.223.3:622.33.012.22 (477.61/.62)

CENTRAL DONBASS MINE DEVELOPMENT RECOMMENDATIONS DISCUSSED

Moscow UGOL' in Russian No 8, Aug 84 pp 17-20

[Article by Candidate of Technical Sciences Ye. P. Kalmykov: "Opening the Lower Horizons of Deep Mines in the Central Donbass Region"]

[Text] The coal fields of the Central Donbass Region consist of the Middle Carboniferous Smolyaninovskaya C_2^3 Formation, Kamenskaya C_2^5 Formation, Almaznaya C_2^6 Formation and Gorlovskaya C_2^7 Formation. These have workable seams 0.6-1.7 meters thick, lying at angles of 45-70°. The K, Zh, OS and T grade coals are used for coking.

These fields are being worked by 26 mines having a total production of 18 million tons per year. The Artemugol' Association has 16 mines with a total production of 12 million tons per year, while the Ordzhonikidzeugol' Association has 10 mines with a total production of 6 million tons per year. Almost all the mines in the region are developing 10-20 workable seams. Practically all the mines are very gassy, with a dust danger and a danger of sudden coal bursts and gas blowouts. The rock temperature reaches 36-39° C at depths of 1,000-1,100 meters. The mines' outputs range from 350,000 to 1,050,000 tons per year, averaging about 750,000 tons per year in Artemugol' Association and 600,000 tons per year in Ordzhonikidzeugol' Association. The maximum seam development depths for operating mines in Artemugol' and Ordzhonikidzeugol' associations are 980 and 875 meters, respectively.

The mine fields of the region's operating mines are worked, as a rule, with three central shafts and level cross cuts.

These mines are developed by the level method with consolidated grouping of seams by fringe drifts. A number of mines are opened and developed one level ahead of production in order to work out the overlying seams. Seams worked by the room-and-pillar method have coal removal at the front intermediate cross cuts. In mines using the longwall method, the coal is removed at the rear intermediate cross cuts. The coal is removed from the walls using KGU machines, ANShch roof supports and pick hammers. Development work is done with mining machines and by drilling and blasting. Battery-powered electric trains are used to haul coal, waste rock, materials and personnel along horizontal workings.

The mines have central suction ventilation with air intake through the cage shafts and exhaust through the skip shafts, using centrifugal and axial fans. The seams and associated areas undergo preliminary degasification. The methane is removed by surface-mounted vacuum pumps. A number of deep mines have air conditioners to cool the workings.

The region's mines work two or three levels simultaneously. Thirteen Artemugol' Association mines produce coal on the 750-, 860- and 970- meter levels, while simultaneously designing, opening and developing the 970-, 1080- and 1190-meter levels. Ordzhonikidzeugol' Association mines produce coal on the 545-, 655-, 765- and 875-meter levels while simultaneously developing lower levels.

There are many different types of vertical shaft hoists at the region's operating mines. As a rule, single- and double-skip counterweighted hoists are used to remove coal and rock. These hoists have single-rope hoisting machines with cylindrical and bicylindroconical drums mounted on the surface. Several rebuilt mines have multirope hoisting machines mounted in headframes. The multirope hoists can remove rock and coal from depths up to 1,600 meters. The mines with these hoists can be further developed by simply deepening the existing vertical shafts and cross-cutting from them, down to the technical limit of the mine field. For most of the region's mines, this limit is 1,500 meters.

In addition, at a number of large mines (Artemugol' Association's Imeni V. I. Lenin, Kochegarskaya, Imeni Yu. A. Gagarin and others) have vertical coal- and rock-removal shafts equipped with single-rope hoisting machines with BTsKB-9/5x2.5 bicylindroconical drums. These hoists cannot remove coal and rock from depths greater than 1,100 meters. To open lower levels at these mines, either the operating hoists must be replaced, or new vertical shafts must be sunk and equipped with multirope hoists.

In 1982, a project for opening and developing the 1080-meter level of Artemugol' Association's Imeni V. I. Lenin Mine was developed by Dneprogiproshakht [Dneprovskoye State Instite of Mine Design]. The project provided two alternatives for rebuilding the hoists of the No 5 skip shaft and the No 6 cage shaft. These alternatives had to ensure normal mine operation (maintaining the established production rate of 950,000 tons per year) between the 1190- and 1700-meter levels. The first alternative involved replacing the hoist vessels, machines, headframes and lining of both shafts and building the necessary surface structures. The functions of the two shafts were to be interchanged. The second alternative involved replacing the hoisting machines and headframes of both shafts and the lining of the No 5 shaft. The shafts would retain their original functions. In both alternatives, the hoist reconstruction was expected to take 5 years, with a loss of up to 65 percent of coal output, which is unacceptable.

In view of this, Dneprogiproshakht incorporated a new skip shaft, No 9, into its plan to open and develop the lower levels of the Imeni V. I. Lenin Mine. The plan called for skip shaft No 9 to extend down to the 1300-meter level, with subsequent deepening to the 1710-meter level. In addition, the existing Nos 5, 6 and 8 vertical shafts are to be deepened. Shaft No 9 is to have an inside diameter of 8 meters and a depth of 1370 meters. It will be equipped with two

single-drum hoists with TsSh-5x8 and MK-5x4 multirope hoisting machines and 35- and 15,9-ton skips. The development diagram of the Imeni V. I. Lenin Mine field by four vertical shafts is shown in Fig 1.

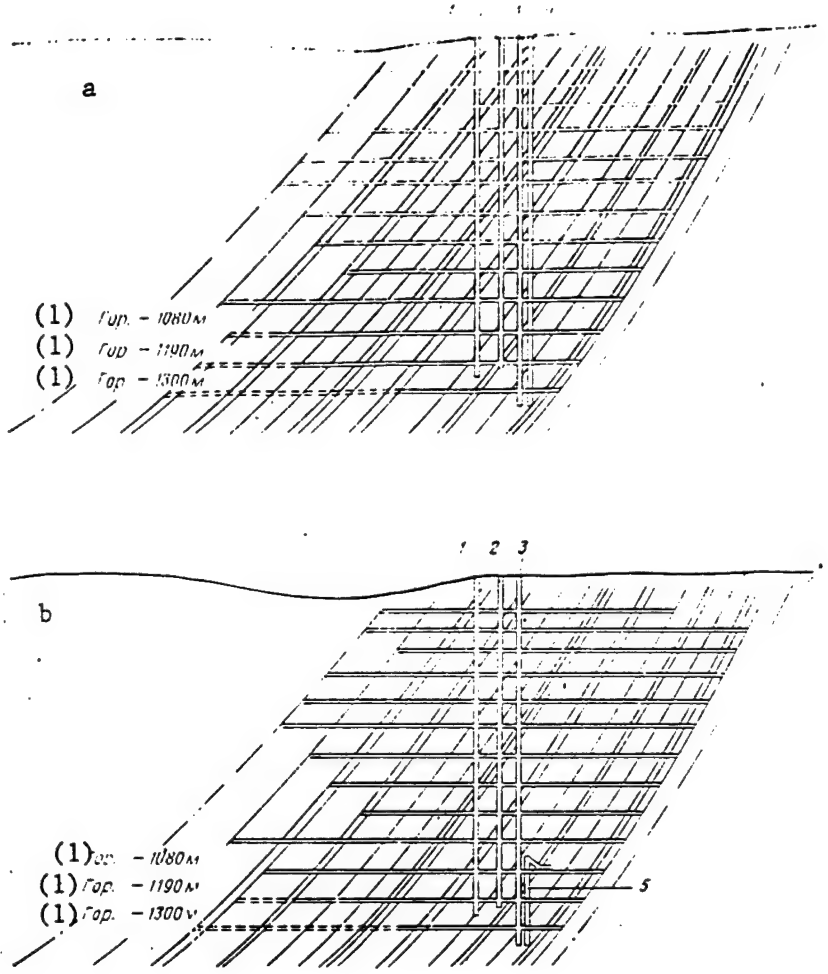

Figure 1. Vertical Diagram of the Development of the Lower Levels (1190-Meter Level and 1300-Meter Level) of the Imeni V. I. Lenin Mine:

by deepening the existing shafts and
a) sinking a new vertical shaft, or
b) sinking an underground shaft from the 1080-meter level;
1, 2, 3, 4) vertical shafts Nos 6, 5, 8 and 9, respectively; 5) underground shaft
KEY: 1. level

The construction of Shaft No 9 as planned will ensure the removal of coal and rock from the lower levels (below the 1080-meter level) at the Imeni V. I. Lenin Mine without a loss of coal output for five years. In the meantime, the hoists in the existing shafts will be rebuilt. However, it will take 10 years to

construct the new shaft (not taking into account the preparatory period). It will also require significant construction expenditures (22.4 million rubles).

The mouth of the new No 9 shaft is to be located in the central production area of the mine. The shaft is to be sunk through the pillar that is already weakened by the Nos 5, 6 and 8 shafts passing through it, as well as by their shaft stations. In addition, it is weakened by the excavations on the worked out and active levels, and also by mining operations on the latter.

Shafts Nos 5 and 6 have an inside diamter of 8 meters and depths of 1,160 and 1,260 meters, respectively. As a result of rock displacement and high rock pressure, a total of 1,175 square meters of supports deformed and broke in certain sections of the No 5 shaft and a total of 1,190 square meters deformed and broke in the No 6 shaft. The use of drilling and blasting in the weakened pillar during the sinking of the No 9 shaft might also worsen the condition of the supports and the lining and lead to more intense deformation. It could also cause the deformation of the concrete support of the No 8 shaft, which has an inside diameter of 8 meters and a depth of 1,128 meters. In addition, the No 9 shaft may be subject to support deformation due to the old intersecting mine workings, and due to deformation and shear of the rocks making up the pillar. A similar situation took place after the No 4 skip shaft (7.5 meters in diameter, 900 meters deep) was completed at the Komsomolets Mine of Artemugol' Association. This mine is adjacent to the Imeni V. I. Lenin Mine. The support of this shaft was deformed and repeatedly repaired in the section between 525 and 650 meters below the surface. The shaft diameter was reduced in certain places to 6.8 meters.

Table 1.

Indicator	New Vertical Shaft No 9	Underground Shaft from the 1080-Meter Level
Level being opened, m	1,300	1,300
Shaft inside diameter, m	8	8
Shaft depth, m	1,370	320
Volume of mine workings, m^3	71,000	24,200
including:		
vertical shaft	68,830	16,080
chambers with passages	2,170	8,120
Volume of shaft surface buildings and structures, m^3	71,000	-
Volume of construction-installation work for the shaft, million rubles	22.4	6.4
Construction period, not taking into account preparatory period, years	10	5

It should be noted that the supports of operating vertical shafts at several deep mines (where levels below 1,000 meters will be opened) in the Central Donbass Region are in unacceptable condition in certain sections. Because of the difficulty of repairing and restoring deformed supports of operating vertical shafts without shutting the shafts down, it will be difficult to sink new vertical shafts in the weakened pillars near the existing shafts.

Due to the large expenditures of time, materials and labor, as well as the large capital investments, it is inefficient to open the lower levels of the region's deep mines by new vertical shafts driven from the surface.

It is more economical and simpler to open the lower levels with underground shafts driven from the bottom level. This can be done without mine operating losses. This method allows the existing mine hoists to operate normally and ensure mine output on the lower developed levels. The underground shafts can then be extended to the lower technical limit of the mine.

As an example, let us consider the opening of the lower levels of the Imeni V. I. Lenin Mine by a new (fourth) vertical skip shaft (No 9) sunk from the surface (see Fig 1, a) and by an underground skip shaft sunk from the 1080-meter level (see Fig 1 b), recommended by us instead of the surface shaft. The basic technico-economic indicators of both methods of opening the lower levels are compared in Table 1. The volume of mining work for the underground shaft includes construction work for the hoist machine chambers, passages to them, coal hoppers and the connecting conveyor passage for coal transfer between the underground shaft hopper on the 1080-meter level and the hopper of the existing No 5 skip hoist shaft on that level.

The data given in Table 1 for the proposed new No 9 vertical skip shaft were taken from the project developed by Dneprogiproshakht for opening and developing the 1080-meter level. The indicators for the proposed underground shaft were determined by the authors using consolidated indicators.

Table 1 shows that the underground shaft development avoids the need to sink a shaft from the surface through 1,050 meters of pillar weakened by mine workings. It also avoids the need to construct 71,100 cubic meters of surface buildings and structures. It reduces the volume of mine workings needed to build the vertical shaft and chambers by 52,700 cubic meters. The total volume of construction and installation work is reduced by almost 16 million rubles, and the construction period is half that of the surface shaft method. In addition, the mine's production cost for 1 ton of coal will decrease by 1-1.5 rubles because of the reduced amortization expenditures.

Thus, it is cost-efficient to open the lower levels of deep mines in the Central Donbass Region by construction underground shafts and deepening the existing shafts, rather than by sinking new vertical shafts from the surface. The underground shaft approach provides the following:

1) high reliability in construction and operation, since the shafts are sunk through the undisturbed lower portion of the pillars;

2) no need to build new surface buildings and structures (and, in certain cases, no need for surface reconstruction, with the removal of existing buildings and structures and the construction of new ones);

3) longer-term and more economical mine operation with the existing hoists of operating vertical shafts and with the same surface buildings and structures;

4) a far smaller volume of construction-installation work for opening the lower levels, with resultant savings of materials and labor;

5) reduced development costs for lower levels, with resultant reduced coal production costs due to reduced amortization of capital investments and

6) significant reduction of lead times for opening and developing lower mine levels.

In light of the data presented herein, the inefficient development of lower levels in deep mines by sinking new vertical shafts from the surface should be avoided. Instead, the more efficient approach of sinking underground shafts from the bottom levels should be used. This method ensures the normal operation of hoists in the existing vertical shafts.

12595
CSO: 1822/26

DRILLING, BLASTING AT NERYUNGRINSKIY MINE DESCRIBED

Moscow UGOL' in Russian No 8, Aug 84 pp 26-27

[Article by Candidates of Technical Sciences A. A. Zvonov and M. F. Kosharnov (NIIOGR [Scientific-Research Institute of Surface Mining]) and Engineer V. A. Korenko (Neryungrinskiy Surface Mine, Yakutugol' Association): "Drilling and Blasting Operations at the Neryungrinskiy Surface Mine"]

[Text] The Moshchnyy Coal Seam is worked at the Neryungrinskiy Surface Mine. The seam's maximum depth is 315 meters, with an average thickness of 25.2 meters. The overburden consists of sandstones with a strength coefficient (according to the scale of Prof. M. M. Protod'yakonov) of f=6-9. The overburden also contains gritstones, aleurolites and argillites of f=6-7. The proportions of rocks making up the overburden are as follows: coarse-grained sandstones, 17.2 percent; medium-grained sandstones, 31.9 percent; fine-grained sandstones, 46 percent; aleurolites, argillites and other rocks, 4.9 percent. The overburden is stratified, with a high degree of cracking.

Drilling and blasting is done to prepare the overburden and coal for removal. In 1983, the volume exceeded 50 million cubic meters; when the mine is at full capacity, it will be 90 million cubic meters per year.

Drilling is done with Soviet-built 2SBSh-200N, SBSh-250MN, SBSh-250-255 and SBSh-320 drills and imported drills. which can handle drill holes of 311-320 mm in diameter. The unfavorable climatic conditions and the presence of permafrost has a negative effect on drilling and blasting working. This effect is especially intense during the warm season, when the surface rock layers melt. The water drains into the holes and freezes when it reaches the permafrost zone, covering the hole walls with an ice crust' whose thickness gradually increases. After a certain time, the holes freeze up completely. The intensity of ice buildup on the hole walls increases even more when precipitation occurs. In 1981, hole loss due to complete freezing totaled 12.3 percent of the total volume of drilling. In addition, when the water inflow into the holes is greatest and before the holes freeze up completely, they are partially filled with water. Due to its mineral content, the water does not freeze up, although its temperature is the same as that of the surrounding rock mass, which is below freezing. The water then contains ice crystals (slush). It is very difficult to charge flooded holes containing slush, even if explosives containing no ammonium nitrate are used, due to their poor submergibility. When ammonium

nitrate explosives are used, the ice crystal content increases in the water because part of the nitrate dissolves, lowering the temperature. This reduces labor productivity during charging, increases explosives consumption and reduces the quality of the blasting work.

An analysis of the various factors on the flooding and freezing processes in drill holes showed that in the first moments after drilling, the air temperature in the hole and the hole wall temperature are above freezing. This is followed by a long period of temperature stabilization, when the hole air temperature, the wall temperature and the incoming water temperature become equal to the temperature of the surrounding rock mass (below freezing). This period lasts anywhere from 10-12 hours to 1.5-2 days. After the temperature stabilization period, intense ice formation begins on the hole walls and the phase composition of the hole water changes (shush formation occurs). Thus, if the holes are charged right after drilling (during the temperature stabilization period), the negative effect of flooding and freezing on the quality of and time needed for charging is either eliminated or reduced. With this in mind, mine personnel, along with specialists from NIIOGR and IGD imeni A. A. Sorochinskiy, developed instructions for charging holes right after drilling. The charging is done when drilling machines and other machinery are no closer than 10 meters. The implementation of this method is 1983 reduced the hole-wall freezing losses 2.4 percent. Hole charging is done on one shift, while drilling is done on three shifts. The implementation of this technology greatly improved the charging quality. It reduced hole losses due to freezing by 9.9 percent, and reduced the specific consumption of explosives by 0.15 kg/cubic meter. It improved the rock breakup and reduced by 0.08 rubles the cost of blasting 1 cubic meter of rock.

The mine uses 30/70, 50/50 and 79/21 grammonites and No 6ZhV ammonite in 90-mm-diameter cartridges for flooded holes and in powder form for dry holes. DSh-A and DShE-12 detonating fuses are used to set off the charge.

In order to improve rock breakup during the winter, powdered No 6ZhV ammonite charges weighing 21 kg are placed in holes from 215-244 mm in diameter, and 42 kg in holes 320 mm in diameter. At least 2 meters of additional packing must be inserted above the additional charge. When the charge column is greater than 5 meters high in flooded holes, two relay detonators are used to ensure that the granulotol and granitol charges will detonate. The lower detonator is placed 0.5-1 meter from the bottom of the hole, while the upper detonator is placed at the same distance from the top of the charge column.

The most widely used blasting patterns for short-delay blasting are diagonal, row and row-sectional. The delay interval between charge groups is 20 milliseconds. Also, simultaneous massive explosions of several neighboring benches are carried out. This reduces the amount of material transport equipment idle time during blasting work.

ZKN-1000 external cumulative charges are used to break up oversize rocks. To ensure blast reliability and reduce explosives consumption, cumulative charges are used along with No 6ZhV powdered ammonite. A 2-3-cm-thick ammonite layer is applied to oversize rocks along with a cumulative charge and a trigger. This charge arrangement ensures better contact with the oversize rock, reducing

to one half the expenditures for breaking up these rocks. The ratio of the ZKN-1000 charge to the No 6ZhV ammonite for this application is 4:1.

The introduction of these techniques, such as charging soon after drilling, centralized relay detonator manufacture, improved methods of detonating hole charges and the oversize rock breakup technology, has improved the efficiency of drilling and blasting work at the mine. Production costs were reduced by 16.3 percent in 1982 compared to 1981 and by 11.2 percent in 1983 compared to 1982.

In the coming years, the mine is to introduce year-round mechanized hole charging and packing, dispersion of hole charges by means of air gaps and other measures. The mine is to switch over to larger diameter holes (260-320 mm) and will begin blasting benches thicker than 15 meters.

12595
CSO: 1822/26

BRIEFS

TULA MINE'S COAL EXHAUSTED--Tula--A coal car with the last ton of coal lifted from the mine is mounted on a pedestal in front of the Moscow Basin's former Underground Mine Progress. It is henceforth a monument to an enterprise that exhausted all its fuel reserves. The fame of Progress's work affairs has gone beyond the basin's borders: for almost three decades the collective was ahead, setting many All-Union records. In the best years, the average monthly excavation per mineworker exceeded 200 tons. The underground mine was awarded the Order of Lenin. Today its miners make up the backbone of the collective of a new high-capacity coal enterprise that was put into operation recently. The name "veteran" passed to it by inheritance. The young Progress mine holds highly the labor-valor banner of its predecessor, and it leads in the socialist competition in honor of the 50th anniversary of the Stakhanovite movement, outracing the production schedule by almost a month and a half. The Progress mine has dispatched from its spur tracks this year 30 extra trainloads of fuel. [Text] [V. Pavlov] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 1 Aug 84 p 2] 11409

TUVA COAL STRIP MINE--Kyzyl--Coal production at the Kaa-Khem coal strip mine at Tuva has risen by more than a fourth since the start of the five-year plan. This was done without an increase in worker manning. Such is the result of the accelerated reequipping of the enterprise. In making up the program for economic and social development, the strip mine's specialists, in collaboration with scientists of an industry institute, studied the suggestions of the excavator operators, the blasters and the motor-vehicle drivers. It became clear during an analysis of the state of affairs that a transportfree system for developing the mine face could be used at one of the sections. Introduction of the innovation enabled tens of people to be released. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 30 Aug 84 p 1] 11409

MARITIME DISTRICT COAL MINE--Vladivostok--Miners of the new Luzanovskiy Strip Mine have mined their first tons of coal. When the mine comes up to design capacity, which is 2 million tons of coal per year, the maritime district will provide itself completely with solid fuel. The Primorskugol'stroy [Primorskiy Kray Coal-Mine Construction Trust] collective introduced this large coal strip mine into operation almost 2 years ahead of the planned date. A joining of the efforts of miners and construction workers helped to speed up its erection. Installation and setting-up of the equipment was performed simultaneously with the stripping operations. Already this month the

Luzanovskiy Strip Mine will send 50,000 tons of high-quality low-ash coal out to the kray's enterprises. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 6 Sep 84 p 1] 11409

SNEZHNOYE ANTHRACITE MINE--Snezhnoye, Donetsk Oblast--Miners of the advanced Underground Mine Zarya of the city of Snezhnoye are competing in shock-work fashion in honor of the 40th Victory anniversary and the 50th anniversary of the Stakhanovite movement: since the start of the year they have mined more than 60,000 tons of anthracite above the plan. All the main technical and economic indicators have improved. Labor productivity surpasses that planned by 10 percent. At the Zarya, longwall-mining machines and other equipment are being used efficiently, and a progressive system for working thin coal seams is being introduced. Miners of the section supervised by Yu. Il'yashevich are showing an example to the whole collective. Since the start of the year they have sent out more than 25,000 tons of coal above the goal. [Text] [V. Vlasenko] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 17 Aug 84 p 1] 11409

KIZEL COAL-BASIN MINE--Perm Oblast--More than 50,000 tons of above-plan fuel have been shipped since the start of the five-year plan to customers of the miners of the Underground Mine Tayezhnaya of the Kizel coal basin. Almost a third of all the additional output--15,000 tons--was sent to the top this year. Success was achieved thanks to the improvement of production organization and to the involvement in the operations of fuel reserves previously written off. Right now almost two-thirds of all the mining the enterprise gets comes from substandard coal seams. Thus, in the near future, the development of a high-capacity coal block under the Bolshaya Gremyachaya stream will begin. Fuel reserves here make up a fourth of a million tons. In order to prepare for the mining, the stream will be diverted to a new; artificial bed. [Excerpts] [P. Chanyshev] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 5 Aug 84 p 1] 11409

KARAGANDA BASIN MINE LEADS--Miners of the Underground Mine Kirovskaya in the Karaganda coal basin--the leader of the shock-work drive in honor of the 40th anniversary of the Soviet people's victory over Fascist Germany--have excavated 125,000 tons of coal above the plan since the start of the year. [Excerpt] [Moscow SEL'SKAYA ZHIZN' in Russian 26 Aug 84 p 1] 11409

VOROSHILOVGRAD OBLAST MINE--Voroshilovgrad Oblast--Ten thousand tons of above-plan fuel monthly--that is the pace adopted this year by miners of the Underground Mine Annenskaya of the Stakhanovugol' Production Association. They have already shipped to customers 70,000 tons of coal above the plan. The miners' brigade of B. Gertsev, which is working on the 1985 labor calendar, made the greatest contribution. Skillfully using narrow-front continuous miners with individual mine supports, this collective brought the daily mining of coal at a thin seam up to 700 tons, which greatly exceeds the standard indicator. [Text] [V. Mikhaylichenko] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 28 Aug 84 p 1] 11409

NOVOKUZNETSK MINE SURPASSES PLAN--Novokuznetsk--Miners of the Bol'shevik Underground Mine of the Oblkemerovougol' Production Association, after sending 3.9 million tons of fuel to the top since the start of the five-year plan, has reported that the plan for the first 4 years of the five-year plan has been

met. They exceeded in all indicators the socialist commitments they adopted at the start of the year in regard to an above-plan rise in labor productivity and an additional reduction in prime production costs. The miners of the advanced enterprise have committed themselves to mining almost 1½ million more tons of fuel by the end of the year. [Text] [P. Romanov] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 7 Aug 84 p 1] 11409

ABOVE-PLAN ANTHRACITE MINING--Voroshilovgrad Oblast--V. Polishchuk's brigade, from the Underground Mine Krasnyy Partizan of the Sverdlovantratsit Association, has sent to the top more than 400,000 tons of coal since the start of the year, 60,000 tons of it above the plan. Right now the advanced collective is on a shockwork drive, which is dedicated to Underground Miners' Day. The miners have brought the average daily workload at the mine face, which is equipped with a longwall miner that includes a 1K-101 continuous miner, up to 2,300 tons of anthracite, or 350 tons above the norms. Right now this is the best indicator for such equipment throughout the Ukraine's Ministry of Coal Industry. Since the start of the year the brigade has fulfilled the labor productivity plan 124 percent. The prime production cost for the coal mined has been greatly reduced. [Text] [V. Mikhaylichenko] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 8 Aug 84 p 1] 11409

CSO: 1822/5

NUCLEAR POWER

AUTOMATED CONTROL FOR NUCLEAR POWER PLANTS DEVELOPED

Vilnius SOVETSKAYA LITVA in Russian 21 Oct 84 p 4

[Article by Antanas Nemura, doctor of technical sciences, professor, corresponding member of the Lithuanian Academy of Sciences, deputy director of the academy's Institute of Physical-Technical Problems of Power Engineering: "The Computer Runs Power Engineering"]

[Editorial Report] The author comments on directions and results of work which the Lithuanian Academy of Sciences' Institute of Physical-Technical Problems of Power Engineering is doing on the development of computerized control systems for power engineering. In particular, personnel of this institute are developing computer program-complexes for monitor control of power stations and systems, as well as simulation models for evaluating the functioning of power systems and for training controllers. They are said to have developed an original method and computer programs for heightening the reliability of initial data on the operating condition of the USSR's unified power system, and research in this direction is continuing.

Heightening the computerization level of monitoring and control systems for nuclear power stations (AES) is called the most promising way of heightening their reliability and efficiency. Work that is being pursued in this direction at the power engineering institute reportedly includes the development of methods for adaptive control of processes in large-capacity nuclear reactors and for early diagnosis of seal failures in equipment. Cybernetic models also are being constructed for forecasting the Ignalina AES' effects on the environment.

FTD/SNAP

CSO: 1822/74

PIPELINE CONSTRUCTION

STATE PRIZE URGED FOR GAS PIPELINE TO NORILSK

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 16 Aug 84 p 2

[Article by A. Trofimuk, chairman of the Scientific Council of the Siberian Department of the USSR Academy of Sciences on Problems of Developing the Tyumen Oblast Oil and Gas Complex, academician and Hero of Socialist Labor (Novosibirsk): "The Key to the Treasury of the North"]

[Text] During the rivalry for the USSR State Prize for 1984, Mingazprom [Ministry of Gas Industry] and Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises] promoted scientific and technical solutions which would, for the first time in the world, permit a complex of gas structures to be built under the extreme conditions of the Arctic and thus provide gas reliably to the Norilsk Mining and Metallurgical Combine. The work was done with the participation of specialists of USSR Mingeo [Ministry of Geology] and the combine. It is of great scientific and practical significance in meeting important national-economic goals--developing the gas industry and gas fields in Far North regions.

Solving the problem was complex because of the region's difficult engineering-geology and the hydrogeological and climatic conditions for developing the fields and building a gas pipeline--permafrost, the large number of swamps, lakes and rivers, and a temperature gradient of -50 degrees to +30 degrees.

The construction of facilities for recovering and transporting gas under these conditions became possible thanks to the creation and introduction of new systems for laying pipelines. The set of problems associated with the erection and operation of pipelines at temperatures of -60 degrees was solved here. Many constructional solutions upon which the design was based were recorded with Goskomizobreteniye [State Committee for Inventions and Discoveries].

The productivity of the gas-pipeline system that was built by implementing basically new scientific and technical solutions that have been worked out and have no counterparts in world experience has now reached several billion cubic meters of gas per year. The use of natural gas at the Norilsk Mining and Metallurgical Combine has enabled the productivity of its basic operating processes to be increased by 25-30 percent, more than 8,000 miners engaged in underground coal mining to be released and sent to the mining of nonferrous metals, and a number of social tasks to be resolved.

The scientific and technical solutions for creating this unique gas-pipeline system, which have been verified by more than a decade of experience, not only justified themselves but they are also being widely used in building up Arctic fields and in erecting high-capacity gas-pipeline systems that are being laid in Far North areas, including the Urengoy-Uzhgorod system.

The work presented deserves the award of the USSR State Prize for 1984.

11409
CSO: 1822/5

UDC 622.691.4.052.012-112

STANDARDIZED COMPRESSOR STATION, DESIGN AND CONSTRUCTION EXPERIENCE

Moscow GAZOVAYA PROMYSHLENNOST' in Russian No 6, Jun 84 pp 6-7

[Article by P. M. Kozlov and A. A. Nishcheta, Southern State All-Union Scientific Research Institute for Design of Gas Pipelines and Enterprises of the Gas Industry]

[Text] The Krasnoturinsk compressor station of the Urengoy-Novopskov gas pipeline was put into operation according to the design of a standardized compressor station with new GTN-16 large unit capacity gas pumping units, developed by YuzhNIIgiprogaz [Southern State All-Union Scientific Research Institute for Design of Gas Pipelines and Enterprises of the Gas Industry]. The labor expenditures of construction were reduced considerably due to standardization of engineering solutions, which led to acceleration of introduction of the compressor station into operation.

The experience accumulated during the past few years on introduction of complete block construction, problems of reducing labor consumption and deadlines of construction and new engineering developments required a fundamental change of the approach to design of compressor stations.

Standard design solutions of standardized compressor stations with different types of GPA [gas pumping unit] were developed through the joint efforts of the design institutes of Mingazprom [Ministry of the Gas Industry] and Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises] and by manufacturing plants.

YuzhNIIgiprogaz is the head institute in development of compressor stations with GTN-16 units, the output of which was organized by the Urals Turbomotor Plant. In 1982 the institute issued the working documentation on standardized compressor stations with GTN-16 units.

The basic principle of the design solutions of compressor stations with GTN-16 units is "through" standardization and unanimity of engineering solutions of the general plan, buildings, structures and installations with solutions for other types of GPA, with the exception of individual solutions caused by the specifics of a unit (specifically, according to the compressor shop).

The configuration of the buildings and structures at the compressor station site is accomplished according to the zoning principle: a production zone in which are located the buildings, structures and installations of the compressor shop, directly related to the process of gas compression, and a service-production zone in which are located auxiliary buildings and structures of the compressor station.

Production services that provide control and energy supply of GPA (operator, hardware, KTP [not further identified] with electric panel, cell room and so on) and also a number of other auxiliary services are interlocked into a production energy unit (PEB).

The remaining auxiliary services (communication terminal, machine shop, garage, chemical laboratory, KIPia laboratory, PKhZ [antichemical protection] laboratory and so on) and also administrative-service rooms are interlocked into a service-operational and repair unit (SERB).

Structurally, these buildings are made in two versions:

the frame-panel version;

BIV (variable height blocks) and SKZ (storable complete buildings) structures.

The configuration of the main production equipment is centralized. There is one each general purification unit, gas cooling unit, fuel preparation unit, pulsed gas starting unit and internal gas unit at the compressor station site.

The compressor shop is equipped with GTN-16 basementless automated working and reserve block turbounits, which consist of N-16-76 full-delivery blowers and all necessary main and auxiliary equipment.

The turbounits are located in individual buildings (15 X 18 meters) and the spacing between the axes of the machines is 27 meters. The unit in the shelter is arranged so that there is a sufficient area for maintenance and repair of it.

The turbine room is equipped with an electric travelling crane controlled from the floor. A cantilever crane is installed in the turbine room for maintenance of the communicator zone. The blower room is supplied with an overhead single-boom electric explosion-protected crane. The equipment and framing reinforcement of the turbounit are assembled into production blocks of complete plant readiness to increase the degree of industrialization and to reduce the periods of construction of the compressor station. An oil preparation unit, which includes an oil separator, filter, oil pump and fittings, is installed in the turbine room.

A reinforcing unit with starting fuel gas filters and blower framework reinforcement for fuel and starting gas and sealing gas is installed in the blower room.

A cutoff fittings unit is installed to cut off the fuel, starting and pulsed gas from the collectors during repair outside the building.

Air oil coolers. They are arranged in a single unit near the outside wall of the GPA building with pickup marker + 1.5 meter, which provides oil drainage from the coolers and of all pipelines by gravity flow into an oil tank upon shutdown of the unit. When the unit is started during the cold season, the oil initially circulates through a small ring (excluding the coolers) and is fed to the cooling units only after being heated to 60°C. This configuration eliminates the need for additional warmup of the cooling units prior to starting.

Delivery of cyclic air is axial. It is collected through an integrated air-cleaning unit (KUV), developed by Soyuzturbogaz [not further identified] and the TsKTI imeni I. I. Polzunov [Central Scientific Research and Planning-Design Boiler Turbine Institute imeni I. I. Polzunov]. The capability of sucking the cyclic air through the oil coolers on the intake of the axial compressor is provided, by which the operating autonomy of the GPA is provided during emergency cutoff of electric power.

A heat utilizer with heat productivity of 8.2 MW is installed on the horizontal section of the smoke channel. There is a single flue, 28 meters high and 3.2 meters in diameter.

The anti-icing system of the GPA operates on the flue gases collected from the gas line.

The N-16-76 blower framing is made of pipes with D_u = 700 mm. The connection diagram is parallel to the collector with D_u = 1,000 mm with starting circuit 426 mm in diameter (the starting collector is D_u = 700 mm). For industrialization of construction, the cocks of the gas framing of the blowers and the fittings are assembled into production units of complete plant readiness (the units of the delivery and intake valves, the check valve and for sampling the fuel, starting and pulse gas).

Approaches are made to the blocks of the delivery and intake valves to provide repair work.

A protective grating is installed at the intake, directly in front of the blower. Spring-loaded supports and lightweight stops are installed near each blower (at the intake and delivery) to relieve the flanges of the blowers from the forces of gas framing.

The unit for preparation of fuel, starting and pulse gas cleans the gas and reduces it.

The gas to the units is sampled from four points: from the main gas line before and after the bypass valve of the compressor station (initially with non-operating compressor station), from the intake collector of the compressor station (after the gas scrubbing unit) and from the delivery collector of the compressor station (before the gas cooling unit). The gas from any sampling point is sent for cleaning of mechanical impurities and then passes sequentially through the heaters, reduction unit and second scrubbing and drying

stage. The pressure of fuel gas is 2.45 $\pm$ 0.049 MPa and the pressure of starting gas is 1.27-1.47 MPa. The gas of the blower seals is utilized as fuel gas.

All production pipelines of D_u = 400 mm or more (regardless of pressure) are divided into separate pipe assemblies, manufactured at the client's plants and delivered to the construction site in complete plant readiness.

The main production and sanitary engineering supply lines, electric cables and KIPiA cables are laid on scaffolds.

The working documentation is developed for climatic and geological conditions according to the requirements of SN227-70 and is corrected with regard to use in a climatic zone with calculated temperature up to -40°C.

New engineering solutions used in creation of the working documentation of the compressor station design have a number of advantages compared to those used previously.

The safety and reliability of the operating conditions of the compressor station has been increased and the length of supply lines has been reduced to zoning of the territory of the compressor station and interlocking of buildings. Moreover, this made it possible to work out a unified design principle of the general layouts of compressor stations with any types of GPA, bringing the density of the construction site up to 45 percent.

Interlocking the main and auxiliary rooms in PEB and SERB buildings considerably simplified the engineering solutions of the relationship of these services. The operating conditions were improved and the length of supply lines, the volume of construction and installation work at the site of the compressor station and the dimensions of the territory of the compressor station were reduced.

The use of a number of units that do not require permanent maintenance personnel and that permit complete delivery of articles in complete plant readiness in the block-complete version significantly reduces the labor expenditures on construction of them at the sites of compressor stations (water intake, purification facilities, oil management unit, storage boxes, diesel electric plant, boiler plant, circulating pumping unit of automatic fire extinguishers, air-heating unit of trucks, methanol storage units and so on). All these box units were fundamentally revised and some were newly developed by the SPKB [special planning and design office] Proyektneftegazspetsmontazh jointly with YuzhNIIgiprogaz and VNIPItransgaz [not further identified].

The heating pipes, oil pipelines and compressed air lines are laid on low supports, while power cables and KIPiA cables are laid on combined scaffolds. Because of this, the level of industrialization of construction of the compressor station is increased, the laboriousness of construction is reduced (one-fourth as much) and operating reliability is improved.

A significant advantage of designing a standardized compressor station with GTN-16 units is a saving of time in all phases (design, ordering of equipment

and materials, manufacture of equipment, production units and complete block devices and production of construction and installation and starting-adjusting work).

The quality of design and construction using a standardized design was increased. The reliability and operating conditions of the compressor station were improved.

The technical and economic indicators of a standardized compressor station are distinguished advantageously from the indicators of compressor stations designed during the 10th Five-Year Plan. A reduction of the following is typical at similar total productivity of 85-100 million m^3/day for a standardized compressor station:

the laboriousness of construction is reduced by 41,800 man-days (37 percent);

metal consumption is reduced by 3,000 tons (37 percent);

concrete consumption is reduced by 3,200 m^3 (29.3 percent), including monolithic concrete consumption by 2,860 m (62.7 percent); the volume of construction and installation work is reduced by 2.3 million rubles (37.3 percent).

All this made it possible to reduce the expenditures for the compressor station by 350,000 per year compared to the analog (a compressor station with GTK-10-4 units).

The standardized compressor station with GTN-16 units began to be tied in in the Urengoy-Novopskov gas pipeline system. Detail plans for five compressor shops of the Pelym and Krasnoturinsk compressor stations of the Urengoy-Pomary-Uzhgorod and Urengoy-Center gas pipelines have been issued.

The Krasnoturinsk compressor station has already become operational (see figure). Its first months of operation indicate the reliability of new GTN-16 serial units.

Investigations are now being conducted on the basis of its operating experience to refine some adopted engineering solutions, specifically: optimization of the use of hoisting-transport equipment to improve repair conditions, improvement of the configuration solutions of the water intake unit to reduce the hydraulic resistance and the level of sound pressure of the water intake channel, development of production units to reduce their overall dimensions and to improve maintenance conditions and so on.

The work conducted by Mingazprom and by its institutes to standardize the engineering solutions of compressor stations far from exhausts all possibilities established in the standardization principle itself. YuzhNIIgiprogaz together with institutes of Mingazprom and other departments continues work on a further increase of the degree of standardization and improvement of the design solutions of compressor stations.

6521
CSO: 1822/361

UDC 622.691.4.004.14(211)

DESIGN SOLUTIONS FOR COOLING TRANSPORTED GAS

Moscow GAZOVAYA PROMYSHLENNOST' in Russian No 6, Jun 84 p 5

[Article by V. I. Yelistratov, G. K. Lisovoder, L. G. Chikalova and I. V. Boltenko, Southern State All-Union Scientific Research Institute for Design of Gas Pipelines and Enterprises of the Gas Industry]

[Text] Schemes with expansion turbine and steam compressor cooling machines have been considered at UKPG and KS [compressor station] for gas transported from northern fields.

Installations for cooling gas at field facilities (UKPG) and compressor stations for main gas pipelines are designed by YuzhNIIgiprogaz [Southern State All-Union Scientific Research Institute for Design of Gas Pipelines and Enterprises of the Gas Industry] on the basis of theoretical and experimental investigations on the problem of cooling the transported gas, conducted at VNIIgaz [All-Union Scientific Research Institute of Natural Gas] and at VNPO [All-Union Scientific Production Association] Soyuzturbogaz.

Engineering and technical and economic problems of selecting the cooling equipment for cooling gas at UKPG and compressor stations are considered by the institute in plans for development of the Yamburg field and the main Yamburg-Yelets and Urengoy-Center gas pipelines.

Gas cooling stations based on expansion turbine units (TDA) in combination with gas AVO [air-cooling equipment] and recuperative heat exchangers (at compressor stations) and also based on steam compressor cooling machines (PKKhM) were compared.

Gas Cooling at Compressor Stations of Main Gas Pipelines

Soviet industry has now developed and is introducing the following cooling units, which can be used to cool transported gas at the compressor stations of main gas pipelines to soil temperature:

the 10GKN2 (2.9-3.5)-(16-17.6) propane reciprocating gas motor compressor;

the ATKP-235-4000 propane electric drive turbounit;

the ATKA-445-6000 ammonia electric drive turbounit;

the ATP5-16/1 propane-butane electric drive turbo cooling unit;

the TKA-P-6.3/10 turbocompressor unit with drive from NK-12ST aviation turbine.

Taking into account the complexity in operation of artificially cooled steam compressor units under severe climatic conditions, the institute considered two gas cooling schemes with expansion turbine units in combination with AVO and gas-gas recuperative heat exchangers on the basis of proposals of VNIIgaz and VNPO Soyuzturbogaz.

Technical and economic developments show advantages in use of cooling stations based on steam compressor cycles with centrifugal compressors having electric and gas turbine drive at the compressor stations of main gas pipelines.

A practical complication in use of electric drive units is, as shown by practice, the absence of a centralized energy supply, especially during the initial operating period of gas pipelines.

The problem of using cooling units based on expansion turbine unit at compressor stations merits specific attention due to their relative simplicity and lower explosion and fire hazard.

Gas Cooling at UKPG

The following sources of synthetic cooling were compared in the design for development of the Senoman pool of the Yamburg field for selection of the cooling scheme for dried gas at the UKPG:

expansion turbine units in combination units with gas AVO;

a cooling station with propane-butane PKKhM.

Under the specific conditions of the Yamburg field when cooling gas at UKPG in expansion turbine units, the losses of gas pressure comprise 1.2-1.4 MPa, which determines the additional compression of gas (compared to the version of cooling gas by the PKKhM scheme), an increase of diameters (or number of runs) of field collectors or a greater degree of gas compression at the pilot compressor station of the field.

The results of technical and economic calculations indicate the significant advantage of cooling gas at UKPG using expansion turbine units in combination with AVO.

The saving under conditions of the Yamburg field comprises on the order of 30 million rubles.

The use of expansion turbine units at UKPG also provides more optimal use of the bed energy of the gas during the compressorless period of operation.

The BTDA-10/13 UKhL block expansion turbine unit was developed by the VNPO Soyuzturbogaz according to the initial requirements of YuzhNIIgiprogaz for the UKPG of the Yamburg field. Bench and industrial tests of the block were carried out during 1983-1984.

6521
CSO: 1822/361

COMPRESSOR STATIONS

GAZLI GAS FIELD RETURNS TO PRODUCTION

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 24 Mar 84 p 1

[Article: "The Field Is Again Operational"]

[Text] The Gazli gas field, which went out of operation after a recent earthquake, has been returned to fuel production. The first millions of cubic meters of natural gas have been sent to the main Bukhara-Urals, Bukhara-Tashkent-Chimkent-Dzhambul-Frunze--Alma-Ata pipelines and to the Fergana Valley and to Osh Oblast of Kirgiziya.

Restoration of the field is essentially a labor triumph that required 3 days. The nine-point earthquake ruptured electric power transmission lines and seriously damaged four compressor stations that deliver gas to the main lines. And whereas the Gazli workers restored the power supply through their own efforts within 5-6 hours after the earthquake, the turbounits required complete inspection and serious repair. And the best installation brigades of Mingazprom [Ministry of the Gas Industry] and USSR Minneftegazstroy [USSR Ministry of Construction for Petroleum and Gas Industry Enterprises] arrived by air by noon of 20 March.

Hardly any information about the natural disaster was sent to Moscow and it was reported from the central dispatch office of the USSR unified gas supply system to Tashkent: We are supplying Urengoy gas to the Urals, for which a number of compressor stations have been put into the forced mode. We are reducing the output of gas from the Central Asia-Center main line. Nevertheless, the fuel from the Turkmen Naip and Gaz-Achak fields is being released for you.

Urgent telephone messages are being transmitted to neighboring republics at this time from Tashkent to all oblasts of Uzbekistan. Normal supply to users, who transferred temporarily to reserve fuel, is being restored.

6521
CSO: 1822/361

COMPRESSOR STATIONS

BRIEFS

GAS COMPRESSOR STATION--Cheboksary--The first unit of the Zavolzhskaya gas compressor station on the Chuvash section of the Urengoy-Pomary-Uzhgorod main line has been brought to design capacity. Construction of the gas compressor station on the run of the Urengoy-Center-1 gas pipeline, laid in parallel, is being conducted simultaneously. It is planned to become operational at the end of the year [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 28 Apr 84 p 1] 6521

SECOND GAS COMPRESSOR UNIT--Cheboksary, 15 Apr 84--The first turbounits have arrived from Leningrad on an urgent basis to the construction site, where the second unit of the Zavolzhskaya gas compressor station is being erected. This is the result of a "workers' relay race." Representatives of Cheboksargesstroy and of the Novocheboksary Administration Volgoneftekhimmontaz, involved in the Zavolzhskaya station, visited the Leningrad Production Association Nevskiy Zavod imeni V. I. Lenin during the winter and signed a cooperative agreement. The remaining units will soon be sent to the Zavolzhskaya station. The builders and installers in turn pledged to complete work on preparation of the second unit of the station for turnover for operation within compressed deadlines. It is designed to service the Urengoy-Center-1 main gas pipeline. [Text] [Moscow PRAVDA in Russian 16 Apr 84 p 2] 6521

AUTOMATIC MONITORING EQUIPMENT--Lvov--Units, serial output of which Lvovpribor plant began, will assist reliable operation of the compressor stations of gas pipelines. Using automatic equipment, they will control the operation of the gas pumping units and will monitor the temperature and pressure of the transported raw material. The first complete set of this equipment was dispatched to the Urengoy-Center-1 main line. More than 100 electronic "dispatchers" for the gas pipelines will be manufactured by the end of the year. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 1 Jun 84 p 1] 6521

6521
CSO: 1822/361

OFFICIALS REPRIMANDED FOR DELAYS IN GAS FUELING OF VEHICLES

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 5 Aug 84 p 2

[Article: "In the Party Control Committee under the CPSU Central Committee"]

[Text] The KPK [Party Control Committee] under the CPSU Central Committee has examined the results of a check on fulfillment by the Ministries of Gas Industry, Automotive Industry, Chemical and Petroleum Machine Building and Ferrous Metallurgy of the USSR of the government decree on questions of using compressed natural gas as a fuel for automotive transport.

The committee's decision noted that the indicated ministries have not taken the appropriate steps to execute the USSR Council of Ministers decree on this question, which is of great economic and social importance.

The established task of converting motor vehicles to operation on compressed natural gas was not carried out. The decree in regard to the construction of motor-vehicle gas-refueling pumping stations also is not being fulfilled satisfactorily, and the capital investment for their construction is not being assimilated. Of the 25 stations that were planned back in 1982-1983, only 10 were put into operation.

The basic reasons for nonfulfillment of the state plan for assimilating capital investment and for turning gas-refueling stations over for operation were delay in developing the design and budget-estimating papers and in coordinating with local soviets for construction sites, and late and incomplete delivery of equipment by the order initiator of the Ministry of Gas Industry (former Deputy USSR Minister of Gas Industry F. Gaynullin).

The USSR Ministry of Ferrous Metallurgy and the UkSSR Ministry of Ferrous Metallurgy did not meet the plan for shipping tas tanks to motor-vehicle plants. Because of this, the established task of manufacturing motor vehicle gas tanks and outfitting equipment was carried out by 17 percent.

USSR Minchermet [Ministry of Ferrous Metallurgy] and UkSSR Minchermet are not meeting the goal for the erection and introduction into operation in 1986 of a department for producing tanks at the Novomoskovsk Pipe Plant of Dnepropetrovsk Oblast, and the same is true of Minkhimneftemash [Ministry of Chemical and Petroleum Machine Building] in regard to construction of the production building at the Krasnodar Compressor Plant. Also not resolved are questions

of providing the gas-refueling stations with air-cooling equipment and gas-drying units and of organizing the production of stations in box-module and containerized versions.

The KPK under the CPSU Central Committee announced a reprimand of CPSU Central Committee member F. Gaynullin, former Deputy USSR Minister of Gas Industry, for serious deficiencies in the work, which led to failure to meet the deadlines for developing the design and budget-estimating documentation and for outfitting the gas pumping stations that are under construction. A reprimand was announced also for CPSU member S. Pliskanovskiy, First Deputy UkSSR Ministry of Ferrous Metallurgy, for unsatisfactory fulfillment of the job or providing motor-vehicle plants with gas tanks and for mismanagement in solving problems of the design and construction of a department for producing tanks at the Novomoskovsk Pipe Plant.

The committee took official note of the announcement of the Deputy USSR Minister of Gas Industry S. Kashirov, the Deputy USSR Minister of Chemical and Petroleum Machine Building A. Buguzov and First Deputy USSR Minister of Ferrous Metallurgy S. Kolpakov that they had taken additional measures to improve the development of design and budget-estimating information, the delivery of outfitting equipment and of tanks for gas-refueling stations and plants in 1985 and during the 12th Five-Year Plan, and fulfillment of the state plan for producing motor-vehicles and gas equipment.

The announcement of Deputy USSR Gosplan Chairman G. Stroganov that Gosplan will improve coordination of the activity of ministries and agencies with a view to fulfilling USSR Council of Ministers decrees on using compressed natural gas as a fuel for automotive transport was noted officially.

11409
CSO: 1822/5

END